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C program to read gcm_tran file written only for the wet grid
C modified UK 1/9/2014
C modified UK 5/7/2014 for GRID_NUM = 40 instead of 42
C modified UK 5/9/2014 for removing WY1213 day 303 patch for incomplete ST
C           sedtran is now complete
C modified UK 6/29/2014 for processing pieces of karray, time may not
C           start at 0

program get_cwcm_waterdepth_v2

C number of water cells
  parameter (ICNTRAN=1948)
C extent of model grid, number of layers
  parameter (IM=44,JM=243,KBM1=10)
C only need longmatch locations
  parameter (GRID_NUM=1942)

C include 'comdeck'
C including comdeck common block causes problems for read, so ignored

C gcm_tran and sigma calculation arrays
  integer tnum, fin, indx(ICNTRAN), jndx(ICNTRAN),
  +      sigmatop(im,jm), sigmabot(im,jm)
  real tmiddle, rcau(ICNTRAN,KBM1), rcav(ICNTRAN,KBM1), rcaw(ICNTRAN,KBM1),
  +      rcaamx(ICNTRAN,KBM1), rcaamy(ICNTRAN,KBM1), rcakh(ICNTRAN,KBM1),
  +      rcakm(ICNTRAN,KBM1), rcae(ICNTRAN), rcaed(ICNTRAN),
  +      rcas(ICNTRAN,KBM1), rcat(ICNTRAN,KBM1), wdpth(IM,JM)
C rcae is water surface elevation used for sigma lookup calculation

C geometry of grid - bed elevation
  real H(im,jm)

C shapefile variables
  real Rmile(GRID_NUM)
  integer I_Grid(GRID_NUM), J_Grid(GRID_NUM)
  character Label(GRID_NUM)*8

C stores sigma layers in hourly timesteps closest to the 15-minute hydro coupling
  real karray(GRID_NUM)
  real diff

C read in i, j list needed for CWCm model to data matching
  longmatch_ij = 25
  open(longmatch_ij,file='longmatch_ij.prn')

  read(longmatch_ij, '(80X)')
  do i=1,GRID_NUM
    read(longmatch_ij, '(A20,2I20,F20.2)')
    +      Label(i),I_Grid(i),J_Grid(i),Rmile(i)
  enddo

C read in number of water cells and QC
  fin = 1
  open(fin,form='unformatted',file='wet_grid')
  read(fin)

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if(i.NE.ICNTRAN) then
  write(*,*)'i.NE.LA_WETGRID', i
  stop
endif

C read in i, j indices of water cells
do i = 1, ICNTRAN
  read(fin)indx(i), jndx(i)
enddo
close(fin)

C read in model geometry
open(fin,file='gcm_geom',form='unformatted')
read(fin) DZ,DZZ
read(fin) H,H1,H2,TPS
read(fin) ANG,NU
close(fin)

C QC file to make sure sigma layer indices are printed correctly
fout = 2
open(fout, file='waterdepth_qc.txt', form='formatted')

C open and start reading gcm_tran for water elevation info
open(fin,form='unformatted',file='gcm_tran')

C start karray index timer
t = 0

do while (1.EQ.1)
  read(fin,end=998) tmiddle

C karray timer in hourly timesteps
  read(fin)((rcau(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcav(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcaw(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcaamx(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcaamy(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcakh(i,k),i=1,ICNTRAN),k=1,KBM1),((rcakm(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)(rcaes(i),i=1,ICNTRAN)
  read(fin)(rcaed(i),i=1,ICNTRAN)
  read(fin)((rcas(i,k),i=1,ICNTRAN),k=1,KBM1)
  read(fin)((rcat(i,k),i=1,ICNTRAN),k=1,KBM1)
  write(*,*) tmiddle

  do i = 1, GRID_NUM
    do ij = 1, ICNTRAN

      if((indx(ij).EQ.I_Grid(i)).AND.(jndx(ij).EQ.J_Grid(i))) then

        tmpdpth = H(I_Grid(i),J_Grid(i)) + rcaes(ij)
        if(tmpdpth.LT.0.01) then
          wdpth(I_Grid(i),J_Grid(i)) = 0.01
        else
          wdpth(I_Grid(i),J_Grid(i)) = H(I_Grid(i),J_Grid(i)) + rcaes(ij)
        endif
      endif
    enddo
  enddo
end

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karray(i) = wdpth(I_Grid(i),J_Grid(i))

endif

enddo
enddo

write(fout,'(F10.4,1942f15.4)')tmiddle,karray

enddo

998 continue

C QC file
close(fout)

end
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